

NEW *ORCHESELLA* SPECIES (COLLEMBOLA: ENTOMOBRYIDAE) FROM NORTH AMERICA¹

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ABSTRACT: Three new species of Orchesellinae are described from North America: *Orchesella gloriosa* n. sp. from lichens on granite in Great Smoky Mountains National Park, North Carolina; *Orchesella imitari* n. sp. from mosses growing in Parc de la Gaspésie, Quebec; and *Orchesella texensis* n. sp. from cave litter in Williamson and Travis Counties, Texas. The new species are separated from those previously described by body chaetotaxy and color patterns.

Orchesella gloriosa, NEW SPECIES

COLOR DESCRIPTION

Background white to cream-yellow with blue pigmented color pattern (Figs. 1 and 2) Head, in dorsal aspect, with dark blue pigment forming a band between antennal bases; dorsum with interocular maculae in broken pattern extending posteriorly; gena with blue forming an irregular band extending to oral region, with "C"-shape maculae best seen laterally; ANT I with dark blue basally and distally, ANT II blue distally with longitudinal blue streaking, ANT III with blue basally and distally, ANT IV light blue, darkest apically. Trunk with broken color patterns composed of dark blue pigment: TH II to ABD II with irregular medial stripe and paramedial stripes; ABD III almost entirely blue dorsally; ABD IV and V with medial line continued to mid-ABD V; ABD VI dark blue; laterally with blue forming irregular stripes defined by white, (taken together, overall pattern could be viewed as forming 5 irregular longitudinal stripes); all micro and macro setae with white surrounding sockets giving a stippled-streaking.

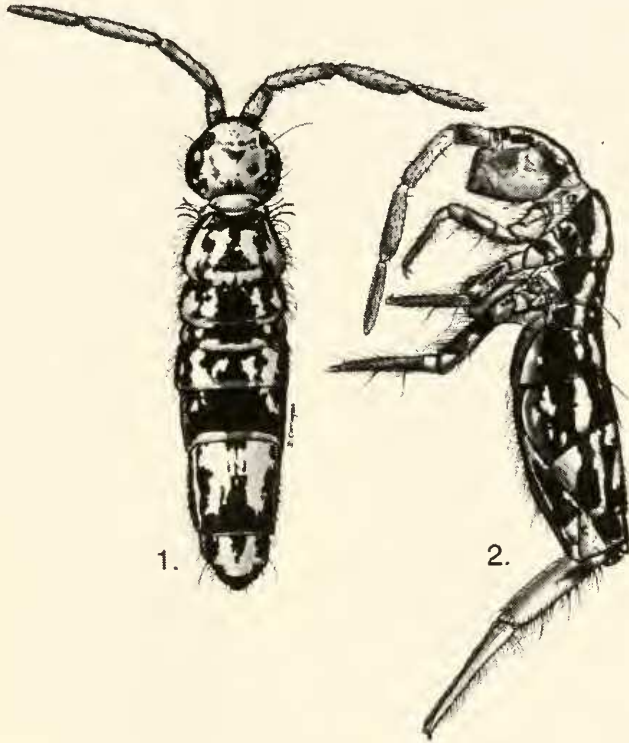
MORPHOLOGICAL DESCRIPTION

HEAD: eyes 8 + 8 on black patches, ocelli A,B,C,D slightly larger than E and F, G and H subequal, G/F ratio \approx .5 (Fig. 3). ANT IV lacking apical bulb, with Type 4 pin seta (Fig. 4); antennal segmentation ratio 3.5 : .5 : 6 : 6 with segment II subsegmented (Fig. 5). Labral papillae clearly unisetaceous (Fig. 6); labial triangle not observed. LEGS: hind foot complex (Fig. 7) with tenent hair shorter than unguis; pretarsus with 2 diagonal, strong bosses; unguis with 2 outer lateral teeth, 4 inner teeth, basal teeth more pronounced; unguiculus .52 - .80 times as long as unguis, with an outer tooth inserted over 1/2 distance from base. FURCULA: dens 1.08 - 1.22 times as long as manubrium; mucronal teeth subequal (Fig. 8). SETAE: Type 5 body setae narrowly fusiform and ciliate for apical .75 of length. Macrochaetae of ABD III with 3 + 3 inner a, 0 + 0 outer a, and 2 + 2 m setae (Fig. 9). LENGTH: 2.4 - 2.6 mm.

TYPES: Holotype (female) preserved in ethanol, 145 paratypes in 95% ethanol, and 26 paratype dissection slides prepared with modified polyvinyl alcohol. Holotype and paratypes deposited in the Center For Arthropod Diversity Studies, Department of Entomology, Michigan State University, East Lansing, Michigan. Holotype and paratypes collected from North Carolina, Swain County, Great Smoky Mountains National Park, December 15, 1987, from lichens growing on a granite boulder, R. J. Snider, collector.

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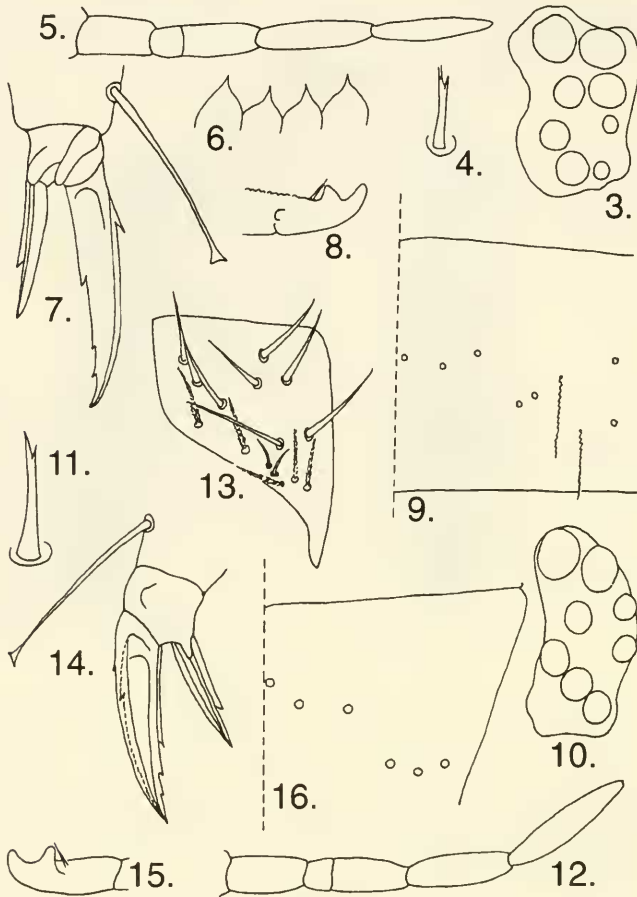
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Figs. 1 & 2 *Orchesella gloriosa* habitus illustrations. 1. Dorsal view showing color pattern. 2. Lateral view showing color pattern.

DIAGNOSIS

Orchesella gloriosa n. sp. keys out in Christiansen & Bellinger (1980-81) to *Orchesella zebra* Guthrie. Color pattern will easily separate the two species. In addition, the chaetotaxy pattern of ABD III for *O. zebra* has 4-6 + 4-6 inner a, 1(0) + 1(0) outer a, and 3 + 3 m setae. *O. gloriosa* has 3 + 3 inner a, 0 + 0 outer a, and 2 + 2 m setae. The claw of *O. gloriosa* is more robust, ungual and unguicular teeth are sharply defined. Chaetotaxy of abdominal segments II and IV are also very different. *O. gloriosa* keys out poorly in Stach (1960) between *O. zebra* Guthrie and *O. xerothermica* Stach. Color pattern alone will separate it from those species.



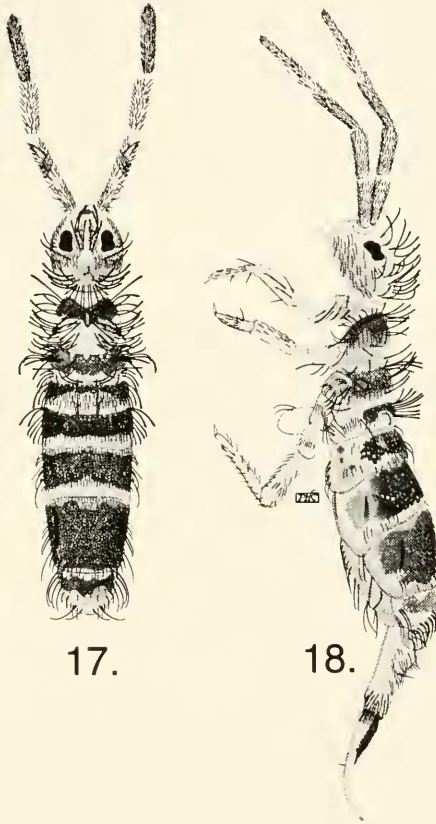
Figs. 3-9. *Orchesella gloriosa* morphology. 3. Left eyepatch. 4. Pin seta of antennal segment IV. 5. Antenna. 6. Labral papillae. 7. Hind foot complex. 8. Mucro, lateral view. 9. Abdominal segment III, dorsal chaetotaxy. Figs. 10-16, *Orchesella imitari* morphology. 10. Left eyepatch. 11. Pin seta of antennal segment IV. 12. Antenna. 13. Labial triangle, setal pattern. 14. Hind foot complex. 15. Mucro, lateral view. 16. Abdominal segment III, dorsal chaetotaxy.

Orchesena imitari, NEW SPECIES

COLOR DESCRIPTION

Background cream-white to light orange with Tuscan red (deep purple brown) pigmented color patterns (Figs. 17 and 18). Head, in dorsal aspect, with dark pigment forming a band between antennal bases with circumantennal extensions; genal area with light dusting of purple;

antennal segments distally ringed with Tuscan red and light pigmental dusting becoming pronounced from base to apex. Trunk dorsally with Tuscan red rings or bands that do not quite terminate at pleural region. TH II with light anterior band leaving most of segment background color; TH III with wide anterior band extending over $3/4$ of segment; ABD I with band $1/2$ length of segment; ABD II band extends $3/4$ length of segment; ABD III with wide band extending more than $3/4$ length of segment; ABD IV with band covering most of segment; ABD V with wide band; ABD VI mostly cream-white to light orange with occasional pigment spots. In dark specimens a "T"-shaped pattern is formed connecting segments V and VI. Legs with broken pigment spots on precoxae and coxae, rest of legs dusted with light purple becoming darker distally, especially tibiae. Furcula and colophore without pigmentation. Many specimens showed pigment reduction to the point of only a scattering of light orange with an overlay of common body setae defining where the color pattern should be.



Figs. 17 & 18. *Orchesella imitari* habitus illustrations. 17. Dorsal view showing color pattern. 18. Lateral view showing color pattern.

MORPHOLOGICAL DESCRIPTION

HEAD: eyes 8 + 8 on black patches, ocelli A and B larger than D, E, F, G while H and C are smaller and subequal, ratio of G/F \approx .85 - .90 (Fig. 10). ANT IV lacking apical bulb, with Type 1 pin seta (Fig. 11); antennal segmentation ratio 3.5 : 4.5 : 5 : 6 with segment II subsegmented (Fig. 12). Labral papillae strongly unisetaceous as in *gloriosa* (Fig. 6); labial triangle setae as illustrated (Fig. 13). LEGS: hind foot complex (Fig. 14) with tenent hair subequal to unguis; unguis with 2 outer lateral teeth, 4 inner teeth; unguiculus .48 - .60 times as long as unguis, with an outer tooth inserted approximately two thirds distad from base. FURCULA: dens 81 - 1.11 times as long as manubrium; mucronal teeth subequal (Fig. 15). SETAE: Type 5 body setae narrowly fusiform and ciliate for apical .80 of length. Macrochaetae of ABD III with 3 + 3 inner a, 0 + 0 outer a, and 3 + 3 m setae (Fig. 16). LENGTH: 1.9 - 2.7 mm.

TYPES: Holotype (female) preserved in ethanol, 128 paratypes in 95% ethanol, and 13 paratype dissection slides prepared with modified polyvinyl alcohol. Holotype and 122 paratypes deposited in the Center For Arthropod Diversity Studies, Department of Entomology, Michigan State University, East Lansing, Michigan. 6 paratypes deposited in the Université de Montreal, Quebec. Holotype and paratypes collected from Canada, Prov. Quebec, Parc de la Gaspésie, Mines Madeleine, July 3, 1996, from moss growing in an exposed location at edge of mixed mesophytic forest. Additional paratypes taken from the following localities: Rte 299 at Chute Ste. Anne, July 2, 1996, from mosses growing along footpath and wet spots; Les Lac Castors, July 3, 1996, from moss overhanging trail margin; Lac Cascapédia, July 4, 1996, from *Sphagnum* moss; Lac aux Américains, trail to Gîte du Mont-Albert, nr. parking lot, July 4, 1996, from *Sphagnum* moss, (R. J. & R. M. Snider, collectors).

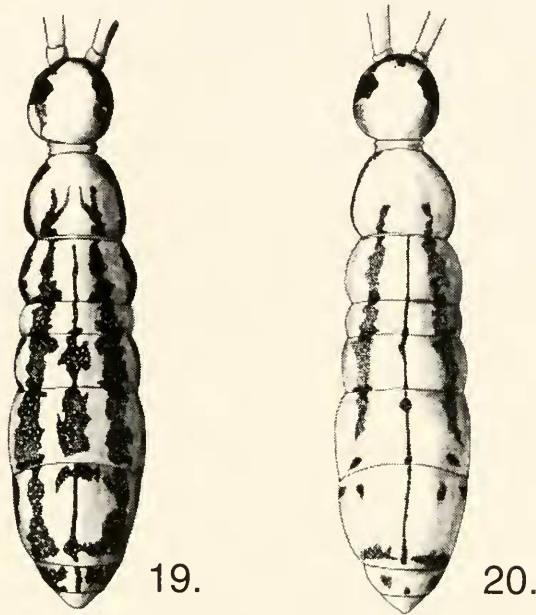
DIAGNOSIS

Orchesella imitari n. sp. keys out in Christiansen and Bellinger (1980-81) to *Orchesella hexfasciata* Harvey and superficially resembles that species. However it can be easily separated from that species by color pattern, and type I pin seta. *O. imitari* keys out in Stach (1960) between *Orchesella leucocephala* Stach and *Ombesella montana* Stach. While *O. leucocephala* is very similar in pattern to *O. imitari*, it has ABD I mostly black banded, *imitari* is cream-yellow with a very narrow band anteriorly; ABD IV of *O. leucocephala* has light areas dorsally, *O. imitari* is solid dark purple.

Orchesella texensis NEW SPECIES

COLOR DESCRIPTION

Background white with blue pigmented patterns (Figs. 19 & 20). Head with interantennal spot spreading to circumantennal extensions; blue stripe originating at posterior edge of eyepatch and ending at occiput; antennal segments with apical rings, light blue dusting becoming darker apically on ANT IV. Trunk with 5 longitudinal, broken lines: medial line begins at posterior edge of TH II and terminates at posterior edge of ABD IV; paramedial lines begin 1/4 distance from anterior of TH II and end at ABD V; lateral lines originate at anterior of TH II and end at ABD V. Legs without pigmentation except trochanter have broken blue patterns.

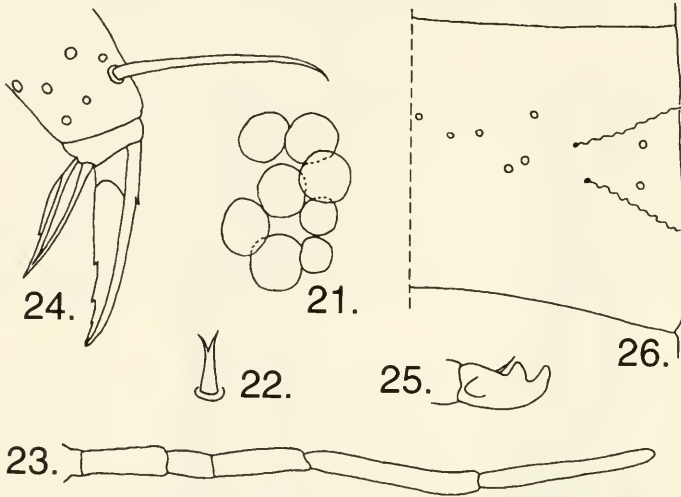


Figs. 19 & 20. *Orchesella texensis* diagrammatic illustrations from slide mounted specimens. 19. Dorsal view showing color pattern. 20. Dorsal view showing reduced color pattern.

MORPHOLOGICAL DESCRIPTION

HEAD: eyes 8 + 8 on black patches, ocelli G and half diameter of A-F, G/F ratio .65 - .75 (Fig. 21). ANT IV lacking apical bulb, with Type 2 pin seta (Fig. 22); antennal segment ratio 1 : 2 : 2.7 : 2.7, segment II subsegmented (Fig. 23). Mouthparts not observed. **LEGS:** hind foot complex (Fig. 24) with tenent hair subequal to unguis length; unguis with 2 outer lateral teeth and 4 inner teeth, unguiculus .93 - .96 times as long as unguis, with outer tooth inserted 3/4 distance from base. **FURCULA:** dens 1.25 - 1.57 times as long as manubrium; mucronal teeth subequal, condyle pronounced (Fig. 25). **SETAE:** Type 5 body setae, narrowly fusiform and ciliate for apical .77-.85 of length. Macrochaetae of ABD III with 3 + 3 inner a, 0-1 + 0-1 outer a, and 2(3) + 2(3) m setae (Fig. 26). **CAPS:** Length 2 mm.

TYPES: Holotype (female) on slide prepared with Marc Andre's fluid, Texas, Williamson County, Jug,cave, May 18, 1989, J. Reddell & M. Reyes, colr. Paratypes taken from the following localities: Williamson County, 2 on slide, Raccoon cave, March 16, 1990, litter, J. Reddell & M. Reyes, colr.; Travis County, 1 on slide, Goat cave, January 23, 1991, litter, J. Reddell & M. Reyes, colr.; 2 on slide, 1 in ethanol, Travis County, Hideout cave, January 31, 1991, litter, J. Reddell & M. Reyes, colr. Holotype and paratypes deposited in the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts.



Figs. 21-26. *Orchesella texensis* morphology. 21. Left eyepatch. 22. Pin seta of antennal segment IV. 23. Antenna. 24. Hind foot complex. 25. Mucro, lateral view. 26. Abdominal segment III, dorsal chaetotaxy.

DIAGNOSIS

Orchesella texensis, sp. keys out in Christiansen & Bellinger (1980-81) to *O. celsa* Christiansen & Tucker. It differs from that species by color pattern, *O. celsa* has the middorsal line not well defined and lacking on ABD IV and V. In addition, *O. texensis* has type 2 pin seta while *O. celsa* has type 4. In Stach (1960) *O. texensis* keys out to *Orchesella xerothermica* Stach. This species from Poland and Ukraine has the mid-dorsal line originating on the posterior of TH II like *O. texensis*, but not reaching beyond ABD I and it is a large species, 4 - 6.2 mm.

ACKNOWLEDGMENTS

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